

REMARKS

Claims 1-4 have been amended as shown in the version with markings to show the amendments made.

Duplex printing is defined as comprising printing on opposing sides of the label sheet by passing the label sheet through the rollers, toner and fuser assembly of a printer twice. Support for this definition is found on page 2, lines 21-22. The language on page 2 refers to printing on “two sides” whereas the definition recited in claim 1 refers to “opposing sides”. Applicants considers these phrases to be equivalent. The amendment to claim 1 does not narrow its scope. Claims 2, 3 and 4 have been amended to refer to “at least one label” to clarify that the claims encompass embodiments having more than one label with the properties recited within the claim. Similarly, claim 4 has been amended to refer to “at least one tie positioned on the leading edge and at least one tie positioned on the trailing edge of at least one label “to clarify” that more than one tie may have the properties recited within this claim.

Method claims 11-16 have not been cancelled in that the Examiner has indicated such claims would be rejoined on finding allowable subject matter within the elected group. New claim 17 depends on method claim 11 and requires that at least one tie be positioned on the leading edge of said label. Claim 18 requires that at least one label has a tie positioned on the trailing edge of a label. Support for these embodiments is found on page 3, lines 27-29.

New claims 19-54 define embodiments of the present invention with further particularity. Claims 19-22 define embodiments wherein the label sheet has “at least one tie on the leading edge.” Claims 23-26 define embodiments wherein the label sheet has at least one tie on the trailing edge. Support for these embodiments is found on page 3, lines 27-31. More particularly, support for the embodiments of claims 20 and 24 is found on page 3, lines 26-27 and support for the embodiments of claims 22 and 26 is found on page 3, lines 29-31.

Claim 27 is an independent claim directed to embodiments wherein a tie at the leading or trailing edge is positioned to correspond to a drive roller of the duplex printer. Claims which depend on claim 27 (claims 28-35) further define particular embodiments with a tie at the leading and trailing edge, multiple labels with ties at the leading edge alone, multiple ties at the trailing edge alone and labels with multiple ties positioned to correspond to the drive rollers of the duplex printer.

New independent claim 36 defines a label sheet having “more than two removably adhered labels” defined by a die cut and each label has one tie positioned on a portion of the perimeter so as to link the labels together. This embodiment finds support on page 3, lines 13-15. Claims 37-46 depend on claim 36 and define particular embodiments with respect to ties located on the leading and trailing edge, leading edge alone, multiple ties and ties aligned with the drive roller of the duplex printer. Support for these embodiments is found on page 3, lines 25-31 as discussed above. Claim 45 defines embodiments wherein the label sheet comprises a feed strip with ties to two labels. Claim 46 defines embodiments wherein the tie has a length of less than one millimeter. Support for the embodiments of claim 46 is found on page 7, lines 24-25.

New claim 47 defines embodiments with multiple labels (more than three) with each having two ties or more. Such embodiments are defined on page 3, lines 26-27 (multiple ties). Support is also found on page 3, lines 13-15, which states “a ‘tie’ is added in one or more places to link the several die-cut shapes together.” The claims which depended on claim 47 (claims 48-54) define the location for the ties at the leading and trailing edge, the leading edge alone, the trailing edge alone as well as in line with the print roller. Support for these embodiments is found on page 3, as discussed above. Support for the limitation wherein the ties have a length less than one millimeter is found on page 7, as discussed above.

Accordingly, based on the above remarks, amendments to the specification, drawings and claims above do not present new matter.

Rejection under 35 U.S.C. §112, Second Paragraph

The rejection under 35 U.S.C. §112, second paragraph is maintained on the basis that “it is unclear as to the location of the face sheet with respect to the label sheet.” Claim 1 has been amended to clarify that the labels of the label sheet are defined by an area on the surface of the face sheet positioned over the adhesive layer. This clarifies the role of the face sheet within the label sheet. The claims also were amended to clarify that the label sheet comprises “at least one” face sheet. The invention comprises embodiments wherein two face sheets are bonded together with a release layer in between. With such embodiments, labels can be cut from each side of the label sheet positioned over the release liner.

Rejection Under 35 U.S.C. §102(e)

It is alleged that since the label sheet of Fox comprises a face sheet and the release liner, then the label sheet of Fox can have two opposing printable sides. It is alleged that the top surface of the face sheet can be printable and the bottom surface of the release liner can be printable. It is also alleged that label sheet 12 of Fox (at portion 26) can be printed on both sides. There is no evidence to support this allegation. Fox does not disclose that the reverse side of the release liner is printable and does not disclose that both sides of portion 26 are printable. Since Fox makes no reference to the ability of these surfaces to accept the print, for these teachings to anticipate the claimed invention the release liner and reverse side of the sheet must inherently be able to accept print. For a rejection based on inherency to be maintained, such inherency must be certain. See *Ex Parte CYBA*, 155 USPQ 756 (POBA 1966). Inherency may not be established by probabilities or possibilities. *In re Skinner*, 2 USPQ 2nd 1789 (BPAI 1986). There is no evidence that these properties necessarily flow from the release liner and face stock employed by Fox.

Attached hereto is Exhibit A which is a copy of a web page from Paper Film and Foil Converter (PFFC). The web page provided is directed to release papers. Paragraph 9 reads:

Clay-coated liners provide a base that is a good silicone coating substrate and does not curl after lamination to paper or film face stocks. They also remain dimensionally stable when used as a carrier sheet for graphite composites. In addition, some clay-coated two sided liners are being used to provide a printable surface for conventional and laser printing on the non-silicone side.

Exhibit B is a web page of International Graphics Films (IGF) which provides a product selection guide for liners. Of the six products identified, only one is indicated as having a backside which is printable. Exhibit C is a copy of the website for FilmLoc™ which describes the components of a label laminate (sandwich). In the last paragraph, an antiblocking coating (ABC) is described. It is said, "ABC coatings cannot be used if back printing is required unless special inks are used." Based on the Exhibits A-C, it is clear the reverse side of the release liner employed by Fox would not necessarily be printable. One skilled in the art could select a release liner that is not printable in that Fox provides no direction to select a release liner that is printable. Therefore, the release liner of Fox does not inherently provide for two opposing

printable sides so as to anticipate Applicants' invention.

In addition, portion 26 of label sheet 12 of Fox is not necessarily printable on both sides. Exhibit D is a copy of a webpage from TEKRA, which provides a chart of various face stocks for labels. As shown in Exhibit D, face stocks can have coatings on a single side which renders them suitable for printing on a laser printer. Therefore, in assembling the forms of Fox et al., one skilled in the art would not necessarily select a face stock which is printable on both sides to arrive at Applicants' invention. The Fox patent therefore does not anticipate any of the claims herein.

The phrase "printable" used in the claims is a positive limitation in that it defines the structure of the elements of Applicants' invention. To be "printable," the face stock must have a surface which will accept print from a duplex printing apparatus that employs toner and a fuser assembly. A face stock having a coating which does not accept such toner is not included in this invention.

Obviousness

The present invention and that of U.S. Patent 6,254,952 were made under an obligation of assignment to the same assignee, NCR Corporation. Therefore, an obviousness rejection based on Fox (U.S. Patent No. 6,254,952) cannot stand. Claims 7, 8 and 9 have not been found to be anticipated and therefore, these claims are clearly allowable over Fox (U.S. Patent 6,254,952).

Claims 2, 3, 20, 21, 24 and 25

The label sheet defined in the above claims prescribe configurations that are not shown by Fox et al. and therefore, and not anticipated by this reference. These claims require either a tie at both the leading and trailing edge of a label, require multiple ties on each label, require ties on each label or require the labels to be tied so as to be linked together. These are preferred embodiments for this invention wherein ties are positioned to secure labels for duplex printing. Fox et al. does not inherently disclose these configurations since no mention is made of duplex printing. The embodiment illustrated in Figure 3 shows a single label having two ties on a leading edge. There is no showing of configurations having ties on the leading and trailing edge, ties located only at the trailing edge (including multiple ties) or ties which link all of the labels

together.

Claims 27-32

Claims 28 and 29, 33, 34, 35 and 32 also define preferred embodiments of the present invention wherein the label sheet either has ties both at the leading edge and trailing edge of a label, ties at the trailing edge of a label alone or at least one tie for every label positioned at either the leading edge or trailing edge of the label or all of the ties are linked together. These claims are not anticipated for the reasons stated above and are fully distinguished in that they require a tie that is aligned with a drive roller of a duplex printer.

Claims 36-46

These claims define label sheets having more than two removably adhered labels with ties. Fox et al. does not disclose such an embodiment. Only one label has two ties on a leading edge which corresponds to a feed roller. Claims 37-44 further define the positions of these ties which are not shown by Fox et al. Claim 45 is further distinguished in that two labels are tied to a feed strip whereas Fox discloses one label tied to feed strip through intermediate layer 40.

Claims 47-54

Claims 47-54 are further distinguish from Fox in that they require more than three removably adhered labels, each having two ties to a portion of a face stock. These labels also require that one tie be positioned to correspond to one of the drive rollers of the duplex printer. Fox et al does not show such a configuration. Only one label is shown to have ties and only one label is shown to have ties in line with the drive roller of a printer. Claims 48-53 define positions of the ties further distinguishing the teachings of Fox. Claim 54 is further distinguished in that it requires the feedstock have at least two labels tied to a feed strip, whereas, Fox shows only a label tied to an intermediate layer.

Based on the above remarks, Applicants submit the pending claims are not anticipated by Fox et al. and are in condition for allowance. Therefore, withdrawal of the rejections, the rejoinder of claims 10-16 (and new claims 17 and 18) and the allowance of claims 1-54 are earnestly solicited.

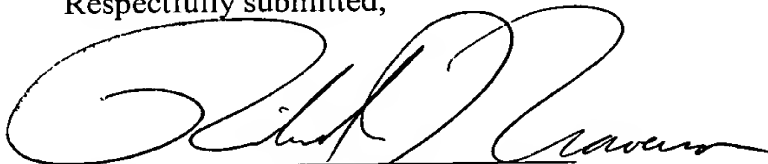
Attached hereto is a marked-up version of the changes made to the claims by the current Amendment and the specification. The marked up versions are captioned, "**VERSION WITH MARKINGS TO SHOW CHANGES MADE**". If there are any remaining issues which should be expedited by a telephone conference, the Examiner is courteously invited to telephone counsel at the number indicated below.

OBJECTION TO THE DECLARATION

The objection to the declaration set forth in the previous office action is presumed to be overcome. A new Application Data Sheet has been submitted to correct the misspelling of one of the inventors names (Mitchell R. Bauer).

The Commissioner is hereby authorized to charge any fees associated with this response or credit any overpayment to Deposit Account No. 14-0225.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Richard J. Traverso', written over a horizontal line.

Richard J. Traverso, Reg. No. 30,595
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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS

The claims are amended as follows:

1. A label sheet for duplex printing which comprises ~~two opposing printable sides, at least one~~ a face sheet with two opposing printable sides, an adhesive layer bonded to the face sheet and a at least one release liner removably adhered to the adhesive,

said label sheet having: ~~two printable sides of the sheet~~, at least one removably adhered label defined by a die cut through the face sheet to the adhesive around the perimeter of the label ~~defining an area on the surface of at least one side of the face sheet~~, and a at least one tie tying the label to another area on ~~the same surface of the face sheet~~, wherein duplex printing comprises printing on opposing sides of the label sheet by passing the label sheet through the rollers, toner and fuser assembly of a printer twice.

2. A label sheet of claim 1, wherein at least one ~~the~~ label is provided with at least one tie on a leading edge of the label and at least one tie on a trailing edge of the label, the leading and trailing edges being defined by the direction the label sheet would pass through a printer.

3. A label sheet of claim 2, wherein ~~the~~ at least one label has multiple ties on the leading and trailing edges, evenly spaced from one another.

4. A label sheet of claim 2, wherein ~~ties are provided~~ at least one tie positioned on the leading edge and at least one tie positioned on the trailing edges so as to edge of at least one label correspond to where the drive rollers of the duplex printer contact the sheet.

5. A label sheet of claim 1, wherein ~~the label is defined by a die cut through the face sheet to the adhesive around the perimeter of the label~~ and the tie(s) are defined by portions around the perimeter of the label which are not die cut.

11. A method for duplex printing a label sheet which comprises feeding a label sheet according to claim 1 through a duplex printer where the duplex ~~printed~~ printer includes an operation where the label sheet is turned over a roller at an acute angle.



VERSION WITH MARKINGS TO SHOW THE CHANGES MADE
DUPLEXING TIES

5 The present invention relates generally to pressure sensitive label sheets, useful for duplexing applications. The invention is particularly applicable for example, to Integrated, Fuse Form™, Dual Web or Full Sheet laser label sheets for duplex printing applications.

Background of the Invention

10 Pressure sensitive labels are commonly available in various forms. In a typical embodiment, a label sheet includes several individually removable labels which define an overlay or face sheet adhesively bonded to a release liner. The adhesive is permanently bonded to the back of the overlay, and forms a weak bond with the liner which typically has an exposed silicone surface permitting individual label removal therefrom.

15 The individual labels are typically defined by full perimeter die cuts which completely sever adjoining labels from their neighbors atop the continuous liner. By lifting the edge of an individual label, the label may be readily peeled away from the liner independently of adjacent labels, with the so removed label then being reattached to another surface using the same adhesive carried on the back of the label for effecting a bond therewith, which is typically permanent.

20 The adhesive must be suitably tailored in strength for maintaining integrity of the entire label sheet to prevent premature delamination of any of the individual labels thereon, while also permitting individual removal of the labels, with the perimeter die cuts preventing simultaneous multiple label removal.

25 It has been known to provide ties between adjoining labels, if it is desired to simultaneously remove two or more labels together. Several such ties may be spaced apart around the perimeter of adjoining labels so that removal of one label carries with it the so tied adjoining label in a serial strip of labels. The so removed individual labels may then be separated from each other by severing or tearing the joining ties.

30 It was ~~has~~ also ~~know~~ been known to provide ties between labels used in simplex (single pass printing) applications in order to prevent delamination of labels. The problem primarily addressed there was extreme delamination, particularly of smaller labels provided

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with a narrow feed strip caused by friction with the printer rollers (see U.S.S.N. 09/259,116, filed February 26, 1999). The ties were thus only necessary on the smaller labels and only on the side first passing the printer roller.

In use, labels are printed for various reasons. For example, a pharmacy script is a specialized label sheet having differently sized and configured individual labels for different objectives. Relatively large labels may be used for identifying dispensed drugs and corresponding use instructions. Smaller labels may contain various warnings. And, an associated paper form integrated with the label sheet may include various information regarding the nature of the drug being dispensed and various instructions and warnings.

Pharmacy scripts are available in different configurations for various reasons. The primary objective of the pharmacy script is the labeling of prescription drug containers in a highly competitive industry. Since a typical pharmacy or drugstore dispenses a considerable volume of drug prescriptions each day, the pharmacy script must be easy and fast to use.

In one recently developed pharmacy script, several wide and narrow labels are formed laterally along a thin strip at the leading edge of the label sheet. The leading edge strip defines the feeding direction for the sheet and its orientation so that various information may be printed atop the various labels of the label sheet in the same configuration as multiple sheets are fed through a printer, such as a typical laser printer. In an initial prototype, the various labels contained full perimeter die cuts to ensure the individual removal thereof when desired. The individual labels must be readily removable without delay or damage to maximize the efficiency of label application to their containers.

It has been known to provide labels for duplex printing, i.e., printing on two sides by passing the media through the rollers, toner and fuser assembly twice. However, the additional heating by two runs through the fuser and the extra manipulation of the media needed to turn it around and run it through the printer process again exacerbated the delamination problem and the problem of adhesive coming off the media into the printer.

Summary of the Invention

The inventors have discovered that, when pressure sensitive adhesive labels are used for duplexing applications, they are subject to more roller passes, e.g. de-curl bars, and to more heat than in simplex applications. For instance, prior to passing the de-curl station,

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the substrate passes through the fuser assembly which melts the toner for anchorage to the substrate. The heat indiscriminately softens the adhesive. This softening together with the stress applied as the substrate is manipulated at an acute angle throughout the printer, duplex unit, and de-curl station causes separation of labels at the die cuts and leakage of the adhesive to the surface. This separation exposes the adhesive to various parts in the printer path. This causes adhesive build-up in the printer and eventual undesired jamming, misfeeds and skewing. Such problems often put the machine out of service requiring attention by a trained service person. It can also damage the fuser assembly and duplex unit.

To avoid these disadvantages, the inventors have discovered that duplexing is improved by tying the die-cut pressure sensitive labels together, and/or to; edges, a matrix, waste strips etc., of the media. Tying the individual labels retains them in juxtaposition and keeps them from separating. The material therefore travels through the de-curl unit with labels intact and little or no leakage of adhesive into the printer. The ties can be strategically placed to fall directly in line with drive rollers within the printer. In order to improve the feed performance of die cut materials within a duplexing operation, during the die cutting process, a "tie" is added in one or more places to link the several die-cut shapes together. Creating a void or dull place within the cutting surface of the die is a preferred way to create a tie. The die cuts as it is designed, except in the void area, thus leaving an uncut section. The uncut section is the tie which continues to attach the individual die-cut sections. Ties prevent the die-cut sections from pulling apart and exposing adhesive within the printer.

According to the invention, the pressure sensitive label sheets, whether of the pharmacy script configuration described above, some other pharmacy script configuration or some other label application, are subject to duplex printing. As described above, the labels are accordingly provided with ties between the labels and other labels, the edges of the sheet, a matrix area, a waste area, etc., of the sheet. The ties are preferably provided by leaving a small area defining the tie not die cut. One or more ties can be provided for a particular label. In one embodiment, multiple ties are provided symmetrically spaced around the label. In another embodiment, one or more ties are provided only at the leading and trailing edges of the label, in terms of the direction of the sheet passing through the printer. In another embodiment, ties are strategically placed to coincide with where the drive rollers of the printer contact the sheet in order to provide additional stability where this friction occurs.

As described above, the invention is particularly useful when the adhesive used in connection with the labels is prone to softening when subject to the heat from the fuser in the printer, for example, at about 400-500°F. The ties keep the label in place, particularly as the sheet is subject to an acute angle to facilitate duplexing, so as to prevent the softened adhesive from leaking off the sheet onto the printer parts. However, the invention can also be applied in applications where the adhesive would not soften in the printer operation, e.g., in cold fuser assemblies or where non-melting adhesives are used. This is because the ties are useful also for preventing delamination which may occur due to the acute angle the sheet is subject to during duplexing.

The laser printers useful in connection with the tied labels of the invention include those known in the art and commercially available, including duplex printers manufactured by LexMark International, Lexington, Kentucky. The construction and operation of duplex printers are known in the art and need not be described here further.

Brief Description of the Drawings

The invention, in accordance with preferred and exemplary embodiments, together with further objects and advantages thereof, is more particularly described in the following detailed description taken in conjunction with the accompanying drawings in which:

Figure 1 is a top view of a label sheet configured in accordance with an exemplary embodiment of the present invention for travel through the laser printer.

Figure 2 is an enlarged view of the top center portion of the sheet illustrated in Figure 1 in accordance with an exemplary embodiment.

Figure 2 3 is an enlarged, elevational sectional view through the forward portion of the label sheet illustrated in Figure 1 and taken generally along line 4-4 positioned below a pickup roller of the printer.

Examples

~~In the foregoing and in the following examples, all temperatures are set forth uncorrected in degrees Celsius, and unless otherwise indicated, all parts and percentages are by weight.~~

An exemplary one of the label sheets of the invention is illustrated in Figure 1 in front view in the form a specifically configured pharmacy script. The forward end of the label sheet is illustrated in more detail in Figure 2 3.

5 The label sheet includes a release liner 20 which may have any conventional configuration and composition, and typically includes a silicone coated material having low adhesion capability. The liner 20 supports a face sheet or overlay 22 which is adhesively bonded thereto using a suitable adhesive 24 such as that typically used for pressure sensitive labels.

10 In the exemplary embodiment illustrated in Figure 1, the label sheet 12 also includes an integrated paper form sheet 26 bonded to the liner 20 at a lap joint therebetween extending the full width of the sheet. The form sheet 26 may be configured for any useful purpose such as containing various printed information thereon for use in conducting a typical pharmaceutical prescription drug transaction.

15 Pharmacy scripts have enjoyed years of commercial use in the United States, and have various conventional constructions and configurations, with multiple pressure sensitive labels attached to a liner integrated with an attached form sheet. More specifically, the release liner 20 illustrated in Figure 1 has a leading edge 20a which first travels through the corresponding path inside the printer ~~10 illustrated in Figures 1 and 2~~. As used herein, leading edges are those edges which first travel along the feed path through the printer, with
20 trailing edges being opposite edges along the travel or feed direction which last follow the corresponding leading edges through the printer.

With respect to Figure 1, the liner leading edge 20a is disposed at the vertical top of the sheet and extends the full lateral or horizontal width therebetween. The trailing edge of the liner 20 overlaps and is suitably bonded to the leading edge of the form sheet 26, also
25 along the entire width of the script. And, the form sheet 26 has a horizontal trailing edge which is disposed at the vertical bottom of the script.

The left and right side edges of the script extend vertically over its length, and define horizontally therebetween the width of the script. The script in the exemplary embodiment illustrated is rectangular, and is longer in length or height than it is wide. The exemplary
30 rectangular script is 8.5 by 14 inches (21.6 cm by 35.6 cm) in height and width, respectively.

The label sheet includes a thin feed strip 28 which extends laterally across the liner 20

adjacent the leading edge 20a thereof. The thin feed strip 28 has a thickness or height of about 5 mm and extends substantially the full width of the liner. The feed strip 28, itself, has a leading edge slightly offset back from the leading edge of the liner by about 1 mm, for example, and also has a trailing edge.

5 The overlay 22 in the preferred embodiment illustrated in Figure 3 2 1 has a plurality of laterally narrow labels 30 laterally adjoining each other, and which are laterally straddled by a pair of wide labels 32 extending laterally to the opposite left and right sides of the liner. The narrow labels 30 are about 12 mm wide, and relatively narrow compared to the wider labels 32 which are about 90 mm in width, for example. The narrow labels 30 are about 41
10 mm in length or height, as compared to the larger wide labels 32 which are 50 mm in height, for example.

Both the narrow and wide labels 30,32 laterally adjoin each other in turn along the length of the feed strip 28 over substantially the entire width of the liner. The feed strip and the labels are defined and severed from each other by corresponding die cuts including
15 vertical die cuts 34 and horizontal die cuts 36. The die cuts 34,36 are conventionally formed using a sharp die blade which severs the overlay 22 down to but not including the underlying liner 22. The die cuts permit the individual removal of the labels from the liner by being peeled away therefrom, without adjoining labels being carried therewith. Each label must be separately removed for subsequent reattachment to another surface as desired using the same
20 adhesive 24 coating the back sides thereof.

Figure 2 illustrates an enlarged view of the top center of the label sheet illustrated in Figure 1. In the exemplary embodiment illustrated, there are four laterally adjoining narrow labels 30 straddled between the end two wide labels 32. The wide labels may be printed by the printer with any useful information regarding a typical prescription drug transaction such
25 as an identification of the prescription and customer, and use instructions, with the labels being manually peeled from the liner 20 individually for reattachment around a prescription container (not shown) or packaging box. The four narrow labels 30 may have printed thereon additional information such as various warnings or use instructions, with each narrow label being individually removable for placement around the prescription container or its box.

30 The specific configuration of the pharmacy script illustrated in Figures 1 and 2 is controlled by its specific intended use. The script is a specialty configuration, having

5 specially configured labels and form sheet. As a result thereof, the feed strip 28 contains a legend stating "FEED THIS DIRECTION" and corresponding arrows which point vertically upwardly along the height of the strip for ensuring the proper feeding of the script in the laser printer 10. The printer is software controlled by a corresponding computer which includes all the desired information being printed atop the script during a transaction.

10 The location of the two pickup rollers 16 from the printer are shown in phantom atop the script illustrated in FIG. 1. The pickup rollers 16 frictionally engage the back side of the liner 20 as illustrated in FIG. 3. One pickup roller 16 engages the liner at the leading edge of a first one of the narrow labels 30 as illustrated in FIG. 1, with the other pickup roller 16 engaging the liner near the leading edge of one of the wide labels 32.

15 The first narrow label 30 illustrated in FIG. 2, directly adjoining the right wide label 32 has a leading edge die cut 36 with at least one interrupting label tie 38 therein for locally joining the narrow label to the feed strip 28. As shown in FIG. 2, the left pickup roller 16 is positioned behind the left wide label 32, whereas the right pickup roller 16 is positioned behind the first narrow label 30 directly adjoining the right wide label 32. Since ties are generally undesirable in the pharmacy script they are preferably not included therein except at limited locations in accordance with the present invention for solving the delamination problem experienced in the printer.

20 Accordingly, the pair of wide labels 32 have continuous die cuts along their leading edges where they adjoin the feed strip 28, without interruption therein or ties. The outboard edges of the wide labels and their trailing edges are exposed atop the liner 30 for permitting their ready removal without interference.

25 As shown in FIG. 1, and in more detail in FIG. 2, the four narrow labels 30 have full perimeter die cuts which are continuous, except for the first narrow label 30 behind which the right pickup roller 16 is positioned during feeding. The leading edge die cut 36 of the first narrow label 30 preferably includes a pair of the label ties 38 symmetrically disposed laterally therealong. For the exemplary 12 mm width of the narrow label 30, the individual label ties 38 each have a width therealong of slightly less than about 1 mm.

30 The vertical die cuts 34 extending along the full lengths of the narrow labels 30 between the adjoining narrow labels and the outboard wide labels 32 permit the individual removal of those labels without restraint by adjoining overlay material. Furthermore, the

label ties 38 are sufficiently small for also permitting individual removal of the first narrow label 30 upon severing the ties 38, which readily occurs as the individual label is peeled away from the liner.

As shown in FIG. 2, the overlay preferably also includes a thin forward midstrip 40 which vertically adjoins the center portion of the feed strip 28, and vertically adjoins the center portion of the feed strip 28, and vertically adjoins the four narrow labels 30 laterally between the outboard wide labels 32. Since the narrow labels 30 are shorter in height than the adjoining wide labels 32, the mid-strip 40 at the top or forward end of the narrow labels permits those labels to be offset vertically between the leading and trailing edges of the outboard wide labels 32.

As shown in FIG. 1, a corresponding narrow, aft mid-strip 42 extends laterally along the trailing edges of the narrow labels 30 and adjoins the outboard wide labels 32, and shares a common trailing edge therewith. The forward and aft mid-strips 40,42 maintain the continuity of the overlay 22 around the narrow labels 30 for maintaining label integrity during the manufacturing and printing processes and have heights of 3 mm and 6 mm, respectively, for example.

The vertical die cuts 34, and the horizontal die cuts 36 define the perimeters of the several narrow labels 30 and wide labels 32 where they adjoin, as well as where they adjoin the forward mid-strip 40 and the feed strip 28. As shown in FIG. 2, the label ties 38 interconnect the first narrow label 30 and the forward mid-strip 40 for maintaining integrity therebetween during launching of the script through the printer by the pickup roller 16 therebehind.

The forward mid-strip 40 laterally adjoins the left side of the right wide label 32 as illustrated in FIG. 2 at the corresponding vertical die cut 34 thereat. The forward mid-strip 40 itself, and both the wide labels 32 vertically adjoin the feed strip 28 along a common horizontal die cut 36 which extends between the left and right ends of the script. The common die cut 36 includes a plurality of strip ties 44 which are interruptions in the die cut for locally joining together the mid-strip 40 to the feed strip 28.

Like the label ties 38, the strip ties 44 are as narrow as possible and are less than about 1 mm for example to provide local ties between the two strips for preventing premature delaminating of the overlay material during travel through the printer. The strip ties 44 are

preferably equally spaced apart from each other along the length of the forward mid-strip 40 at about 11 mm, for example. The strip ties 44 ensure integrity of the thin strip 28 and the thin forward mid-strip 40 as the label sheet is launched through the printer by the pickup rollers 16. The common die cut along the length of the feed strip 28 is continuous from end to end except for the four exemplary strip ties 44 at the forward mid-strip 40.

The label sheet 12 illustrated in FIG. 1 thusly incorporates a thin feed strip 28 which offsets in the aft direction from the sheet leading edge the several narrow and wide labels 30, 32 for maintaining their integrity during handling and traveling through the printer. Since the feed strip 28 is typically not used as a label itself, it is preferably as thin as practical, 5 mm for example, for protecting the leading edges of the wide labels 32 and maintaining integrity of the overlay.

The first narrow label 30 is positioned laterally atop the liner 20 for being in alignment with the corresponding pickup roller 16. And, the label ties 38, as illustrated in FIG. 2, are also aligned with the corresponding pickup roller 16 when the label sheet 12 is loaded into the paper tray, with the label ties 38 interconnecting the feed strip 28 to the first narrow label 30 through the intervening mid-strip 40.

The locally positioned pair of label ties 38 maintain integrity of the first narrow label with the corresponding portion of the forward mid-strip 40. And, the additional strip ties 44 maintain integrity of the thin forward mid-strip 40 with the feed strip. In this way, the thin mid-strip 40 is interconnected with the feed strip 28 along its forward edge, and with the narrow labels 30 along its opposite aft edge, with the corresponding label and strip ties 38, 44 providing structural ligaments.

In the exemplary embodiment illustrated in FIG. 1, a horizontal row of three laterally adjacent aft labels 46 is disposed below the narrow and wide labels and spaced therefrom atop the liner 20.

The selectively introduced ties 38, 44 cooperating with the forward mid-strip 40 and feed strip 28 in the various embodiments disclosed above ensures integrity of the label sheet 12 as it is transported through the printer, without premature delamination of any of the labels therefrom. Upon complete printing of the various labels on the script, the individual labels may then be separately removed without carrying therealong any of the adjacent labels, or without carrying the feed or mid-strips which remain attached to the liner 20. The first

narrow label 30 may be readily removed from the liner by being peeled away therefrom preferably starting from its trailing edge which will readily sever the label ties 38 without otherwise tearing the label itself.

5 The entire disclosure of all applications, patents and publications, cited above is hereby incorporated by reference.

From the foregoing description, one skilled in the art can easily ascertain the essential characteristics of this invention and, without departing from the spirit and scope thereof, can make various changes and modifications of the invention to adapt it to various usages and conditions.

What Is Claimed Is:

1. A label sheet for duplex printing which comprises ~~two opposing printable sides; at least one~~ a face sheet ~~with two opposing printable sides~~, an adhesive layer bonded to the face sheet and a ~~at least one~~ release liner removably adhered to the adhesive,

said label sheet having: ~~two printable sides of the sheet~~, at least one removably adhered label ~~defined by a die cut through the face sheet to the adhesive around the perimeter of the label defining an area on the surface of at least one side of the face sheet~~, and a ~~at least one~~ tie tying the label to another area on ~~the same surface of the face sheet~~, ~~wherein duplex printing comprises printing on opposing sides of the label sheet by passing the label sheet through the rollers, toner and fuser assembly of a printer twice~~.

2. A label sheet of claim 1, wherein ~~at least one~~ the label is provided with at least one tie on a leading edge of the label and at least one tie on a trailing edge of the label, the leading and trailing edges being defined by the direction the label sheet would pass through a printer.

3. A label sheet of claim 2, wherein ~~the at least one~~ label has multiple ties on the leading and trailing edges, evenly spaced from one another.

4. A label sheet of claim 2, wherein ~~ties are provided at least one tie positioned on the leading edge and at least one tie positioned on the trailing edges so as to edge of at least one label~~ correspond to where the drive rollers of the duplex printer contact the sheet.

5. A label sheet of claim 1, wherein ~~the label is defined by a die cut through the face sheet to the adhesive around the perimeter of the label and the tie(s) are defined by portions around the perimeter of the label which are not die cut~~.

6. A label sheet of claim 1, wherein the label sheet comprises two face sheets and two adhesive layers, one each on each side of the release liner.

7. A label sheet of claim 6, which comprises at least one label on each side of the sheet.
8. A label sheet of claim 1, wherein the label sheet comprises multiple labels on at least one face sheet and each label is provided with at least one tie to another label, to an edge of the face sheet around its perimeter and/or to a matrix of the face sheet separating the labels from one another.
9. A label sheet of claim 1, wherein the adhesive layer is comprised of an adhesive which softens at temperatures to which it is subject during duplex printing with fusion of the toner by heating.
10. A label sheet of claim 9, wherein the adhesive softens at a temperature from 400 to 500°F.
11. A method for duplex printing a label sheet which comprises feeding a label sheet according to claim 1 through a duplex printer where the duplex printed printer includes an operation where the label sheet is turned over a roller at an acute angle.
12. A method of claim 11, which includes an operation where the label sheet is subject to heating to fuse toner to the sheet.
13. A method of claim 12, wherein the heating is at 400 to 500°F.
14. A method of claim 11, wherein the labels on the label sheet are provided with ties where driver rollers of the duplex printer contact the sheet.
15. A method of claim 11, wherein the labels of the label sheet are provided with at least one tie on a leading edge of the label and at least one tie on a trailing edge of the label, the leading and trailing edges being defined by the direction the label sheet would pass through the printer.

16. A method of claim 15, wherein the labels have multiple ties on the leading and trailing edges, evenly spaced from one another.

17. (NEW) A method of claim 11, wherein at least one label of the label sheet is provided with at least one tie on a leading edge of said label, the leading edge being defined by the direction the label sheet would pass through the printer.

18. (NEW) A method of claim 11, wherein at least one label of the label sheet is provided with at least one tie on a trailing edge of said label, the trailing edge being defined by the direction the label sheet would pass through the printer.

19. (NEW) A label sheet of claim 1, wherein at least one label of the label sheet is provided with at least one tie on the leading edge of the label, the leading edge being defined by the direction the label sheet would pass through a printer.

20. (NEW) A label sheet of claim 19, wherein at least one label has multiple ties on the leading edge of the label, evenly spaced from one another.

21. (NEW) A label sheet of claim 19, wherein the label sheet comprises multiple labels on the face sheet and each label is provided with at least one tie on the leading edge.

22. (NEW) A label sheet of claim 19, wherein at least one tie is positioned on the leading edge of at least one label so as to correspond to where the drive rollers of the duplex printer contact the sheet.

23. (NEW) A label sheet of claim 1, wherein at least one label of the label sheet is provided with at least one tie on the trailing edge of the label, the trailing edge being defined by the direction the label sheet would pass through a printer.

24. (NEW) A label sheet of claim 23, wherein at least one label has multiple ties on the trailing edge, evenly spaced from one another.

25. (NEW) A label sheet of claim 23, wherein the label sheet comprises multiple labels on the face sheet and each label is provided with at least one tie on the trailing edge.

26. (NEW) A label sheet of claim 23, wherein at least one tie is positioned on the trailing edge of at least one label so as to correspond to where the drive rollers of the duplex printer contact the sheet.

27. (NEW) A label sheet for duplex printing which comprises a face sheet with two opposing printable sides, an adhesive layer bonded to the face sheet and a release liner removably adhered to the adhesive,

said label sheet having one or more removably adhered labels defined by a die cut through the face sheet to the adhesive around the perimeter of said label,

wherein one or more of said labels has at least one tie defined by a portion of the perimeter of said label which is not die cut,

wherein at least one tie for a label is positioned on the leading or trailing edge of said label so as to correspond to where the drive rollers of the duplex printer contact said label sheet, the leading or trailing edge being defined by the direction the label sheet would pass through a printer, wherein duplex printing comprises printing on opposing sides of the label sheet by passing the label sheet through the rollers, toner and fuser assembly of a printer twice.

28. (New) A label sheet of claim 27, wherein at least one label is provided with at least one tie on a leading edge of the label and at least one tie on a trailing edge of the label, the leading and trailing edges being defined by the direction the label sheet would pass through a printer.

29. (NEW) A label sheet of claim 28, wherein the label sheet comprises multiple labels on the face sheet and each label is provided with a tie on the leading edge which corresponds to where the drive rollers of the duplex printer contact said label sheet and a tie on the trailing edge which corresponds to where the drive rollers of the duplex printer contact

said label sheet, the leading and trailing edge being defined by the direction the label sheet would pass through a printer.

30. (NEW) A label sheet of claim 27, wherein at least one label is provided with at least one tie on the leading edge of the label, the leading edge being defined by the direction the label sheet would pass through a printer.

31. (NEW) A label sheet of claim 30, wherein at least one label has multiple ties on the leading edge of the label, evenly spaced from one another.

32. (NEW) A label sheet of claim 30, wherein the label sheet comprises multiple labels on the face sheet and each label is provided with at least one tie on the leading edge which corresponds to where the drive rollers of the duplex printer contact the sheet.

33. (NEW) A label sheet of claim 27, wherein at least one label is provided with at least one tie on the trailing edge of the label, the trailing edge being defined by the direction the label sheet would pass through a printer.

34. (NEW) A label sheet of claim 33, wherein each label has multiple ties on the trailing edge, evenly spaced from one another.

35. (NEW) A label sheet of claim 33, wherein the label sheet comprises multiple labels on the face sheet and each label is provided with at least one tie on the trailing edge which corresponds to where the drive rollers of the duplex printer contact the sheet.

36. (NEW) A label sheet for duplex printing which comprises a face sheet with two opposing printable sides, an adhesive layer bonded to the face sheet and a release liner removably adhered to the adhesive,

said label sheet having more than two removably adhered labels defined by a die cut through the face sheet to the adhesive around the perimeter of said label,

wherein each of said labels has at least one tie defined by a portion of the perimeter of said label which is not die cut to link the labels together, wherein duplex printing comprises printing on opposing sides of the label sheet by passing the label sheet through the rollers, toner and fuser assembly of a printer twice.

37. (New) A label sheet of claim 36, wherein each label is provided with at least one tie on a leading edge of the label and at least one tie on a trailing edge of the label, the leading and trailing edges being defined by the direction the label sheet would pass through a printer.

38. (NEW) A label sheet of claim 37, wherein each label is provided with a tie on the leading edge which corresponds to where the drive rollers of the duplex printer contact said label sheet and a tie on the trailing edge which corresponds to where the drive rollers of the duplex printer contact said label sheet, the leading and trailing edge being defined by the direction the label sheet would pass through a printer.

39. (NEW) A label sheet of claim 36, wherein each label is provided with at least one tie on the leading edge of the label, the leading edge being defined by the direction the label sheet would pass through a printer.

40. (NEW) A label sheet of claim 39, wherein each label has multiple ties on the leading edge of the label, evenly spaced from one another.

41. (NEW) A label sheet of claim 39, wherein at least one tie on the leading edge corresponds to where the drive rollers of the duplex printer contact the sheet.

42. (NEW) A label sheet of claim 36, wherein each label is provided with at least one tie on the trailing edge of the label, the trailing edge being defined by the direction the label sheet would pass through a printer.

43. (NEW) A label sheet of claim 42, wherein each label has multiple ties on the trailing edge, evenly spaced from one another.

44. (NEW) A label sheet of claim 42, wherein at least one tie on the trailing edge corresponds to where the drive rollers of the duplex printer contact the sheet.

45. (New) A label sheet of claim 36, wherein the label sheet comprises a feed strip and at least two labels have at least one tie to said feed strip.

46. (New) A label sheet of claim 36, wherein the label is defined by a die cut through the face sheet to the adhesive around the perimeter of the label and the tie(s) are defined by portions around the perimeter of the label of a length less than 1 mm which are not die cut.

47. (NEW) A label sheet for duplex printing which comprises a face sheet with two opposing printable sides, an adhesive layer bonded to the face sheet and a release liner removably adhered to the adhesive,

said label sheet having more than three removably adhered labels defined by a die cut through the face sheet to the adhesive around the perimeter of said label,

wherein each of said labels has at least two ties defined by a portion of the perimeter of said label which is not die cut, each tie having a length less than 1 mm,

wherein each label has at least one tie positioned so as to correspond to where the drive rollers of the duplex printer contact said label sheet, wherein duplex printing comprises printing on opposing sides of the label sheet by passing the label sheet through the rollers, toner and fuser assembly of a printer twice.

48. (New) A label sheet of claim 47, wherein each label is provided with at least one tie on a leading edge of the label and at least one tie on a trailing edge of the label, the leading and trailing edges being defined by the direction the label sheet would pass through a printer.

49. (NEW) A label sheet of claim 48, wherein each label is provided with a tie on the leading edge which corresponds to where the drive rollers of the duplex printer contact said label sheet and a tie on the trailing edge which corresponds to where the drive rollers of the duplex printer contact said label sheet, the leading and trailing edge being defined by the direction the label sheet would pass through a printer.

50. (NEW) A label sheet of claim 47, wherein each label is provided with at least one tie on the leading edge of the label, the leading edge being defined by the direction the label sheet would pass through a printer.

51. (NEW) A label sheet of claim 50, wherein at least one tie on the leading edge of each label corresponds to where the drive rollers of the duplex printer contact the sheet.

52. (NEW) A label sheet of claim 47, wherein each label is provided with at least one tie on the trailing edge of the label, the trailing edge being defined by the direction the label sheet would pass through a printer.

53. (NEW) A label sheet of claim 52, wherein at least one tie on the trailing edge of each label corresponds to where the drive rollers of the duplex printer contact the sheet.

54. (NEW) A label sheet of claim 47, which additionally comprises a feed strip and at least two labels have at least one tie to said feed strip.

ABSTRACT OF THE DISCLOSURE

Described are label sheets of pressure sensitive labels which are useful for duplex printing applications. The labels are provided with ties to secure them in order to lessen the adverse effects of delamination and leakage of adhesive into the printer parts. They are particularly useful for avoiding these disadvantages during duplex printing which subjects the label sheet to additional manipulation and treatment, such as two heated toner fusion steps, in contrast to simplex printing. Also described are methods of duplex printing using such label sheets.